

Vision-Based Object Detection and Distance Calculation in Indoor Autonomous Vehicles

Abstract

Object detection and distance estimation are key technologies for enabling autonomous systems to navigate and interact with their environments effectively. This project is aimed at developing and testing algorithms for simultaneous object detection and distance estimation in indoor autonomous vehicles. The proposed method will utilize YOLOv5 and its variants, as well as YOLOv8 and SSD models, for obstacle detection and distance estimation with a single monocular camera, without requiring further calibration. Training will be performed on a combination of existing datasets, such as KITTI, and a custom-labelled indoor environment dataset. Data augmentation and transfer learning techniques will be used to improve model performance and adaptability. The project will compare and evaluate these methods in order to provide a reliable and cost-effective solution for the accurate detection of obstacles and distance estimation in indoor environments.

Keywords:

object detection, YOLO, SSD, distance estimation, autonomous vehicles

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